

Public Submission - Unconventional gas parliamentary inquiry

Hello,

My name is Robert Brown. I am qualified with a science degree as an industrial chemist. I live in Torquay but feel it is most important to make the point that we are all Victorians. All of Victoria belongs to all of us. Any disaster or bonus in Victoria effects all of us. Let us do better than making the 'not in my backyard arguments'.

I am very concerned about the licenses, prospecting and plans for unconventional gas across Victoria.

Is it Economic ?

Is it Needed ?

Is it Safe ?

Economic

Solar panels have dropped in price to the consumer by a factor of 20 since 1990, from over \$10 per watt to now under 80 cents per watt. This current cost equates over a 25 year lifespan for the cells to under 2 cents per kilowatt hour. The price of wind turbines has dropped by a factor of more than 3. These turbines are not as common place as solar panels yet and so the price is sure to continue dropping significantly. Lithium batteries have more than tripled in storage capacity while reducing their cost to under 1/3 since being launched to consumers in 1990. What all this means is that fossil fuels are no

longer the cheap alternative. Fossil fuels are actually becoming more expensive while solar and wind energy continues to get cheaper. Hydroelectricity is the cheapest power in the world, second is the solar concentrators installed in California's Mojave desert in the mid 1980's.

The recent drop in the price of crude oil has slowed operations for much more expensive unconventional and coal seam gas both in Queensland and elsewhere in the world. The production of this gas is now proved to be quite vulnerable to oil producers in the Persian Gulf lowering the price of oil. Saudi Arabia has proved through changes to its domestic budget it is quite determined to weaken and hopefully eliminate these competitors from the market supplying fossil fuels. It is clear their strategy is designed to last at least for several years.

Needed

Just ten years ago everyone thought that demand for oil and gas would continue to increase, yet it has dropped. Energy needs for both fossil fuels and electricity are now dropping in a strong trend. Cars and trucks are using less fuel to go the same distance. Tyres are producing less drag. Houses are more efficient. They require less energy and many are going off-grid. The energy star ratings have produced houses and appliances which need less today and will continue to lead less tomorrow. There are a rare few gas ovens in the kitchen showrooms and even fewer are being installed. The off-grid housing trend is sure to increase as people become more frustrated at the lack of government action to save the environment. People want to make their own statement in contrast to their governments which are acting too

slowly. People see how thin and limited our atmosphere is, and how vulnerable our planet is to global warming. Going off grid is becoming easier and cheaper with more solar retailers, cheaper batteries and the ever spiralling cost of remaining connected to the grid. Billing customers \$300 per year and soon \$400 just for being connected is having the effect of making many turn off.

More and more biogas is being collected. Biogas is methane just the same as often sits on top of an oil reserve. Just the same as is often needlessly burnt off on an oil rig or at a refinery. In India and many other third world countries, in the poorest of the poor areas people are turning to biogas. If they can afford to capture and use this methane in slums then it must be very low cost. Many countries around the world are making efforts to capture methane generated from their waste. A report on some of the United Kingdoms efforts is available here -

http://www.vision2020.info/assets/pdf/Vision_2020_roadmap.pdf

The 1.1tWh of electricity mentioned is a significant amount. It would be around half of Greater Geelong's yearly electricity consumption. If the methane gas produced was used for heating and cooking instead of the less efficient conversion to electricity, then the number of people catered for more than doubles. This methane produced is simply from food waste. As you know there are a number of other waste streams which could also generate methane. There is more regular garbage, and the amazingly abundant resource left in the poo of ourselves and our livestock.

Australia is capping some sewerage and landfills to capture methane as this practice is becoming more prevalent. Capture of biogas in almost always about waste that was going to decompose and produce methane anyway. The situation is a win : win, it is a win for less methane discharged to the atmosphere, and a win for biogas being used instead of fossil fuels.

Safe

The Geelong and Bellarine population receives 70% of their reticulated water from the Barwon River system, some of which includes groundwater from the Gerangamete bore-field. The quality and chemistry of this water will be affected by future mining, such as the fracking process, that uses toxic chemicals and great volumes of water, to extract gas from deep underground. There simply cannot be any guarantee from anybody that groundwater will not be contaminated, and that residue water coming back to the surface, immediate or long-term (when the well is capped, and the mining company has left) – will not find its way into the water catchment system. When things go wrong this is a problem that has no known way of being fixed.

The Landforms in the area south of Geelong covered in license PEP163 consist of sandstone, siltstone, limestone, mudstone and basalt. All of these rocks are permeable enough to allow the transport of water and other fluids. Basalt is less permeable than the others but as a result of this it holds water for longer periods. The strength of basalt also means that its fractures and faults are more common and last longer.

The research done by Brace(1980) on permeability through the earth's crust showed that laboratory measures of permeability are no reflection of the real earth in situ. This drilling work showed that the permeability was much much greater than anticipated in the rock strata. This work did not test the greater effects that would follow from fracking, use of solvents, liberation of gas, and use of extreme pressures.

Rock is brittle. The way it fractures cannot be accurately predicted. Imagine someone breaking a wineglass. Just how ridiculous is the idea that anyone could predict the size and shape of the fragments created. However this example is far far too easy. Rock strata are not uniform like the glass. Worse is that even the best modern day geology is far from accurately seeing exactly how the rock layers look below the ground. Textbook pictures and earth cross-sections help us understand and imagine the earth under our feet, but they are artist's impressions to a large degree. In the real world such accuracy is still very much a dream.

The fracturing strength of rocks is simply too variable to be usefully predicted. This is why so many mining disasters occur.

Fracking is really the wrong terminology. The more the rock is broken down the more gas is released. As gas extraction is the purpose then the rock will be more obliterated than just fractured.

Rock strata is not stable. The earth moves, bends and twists. Different aquifers move and hold water sometimes over decades, sometimes over thousands of years. Expecting any kind of

containment of a liquid or gas underground is a poor thought from the start.

Let me explain the problem we have here by seeing a similar industry. People working in laboratories use glass vessels of specialised glass. They work under the conditions of atmospheric pressure and a standard comfortable temperature. Ceramic, plastic and other materials are rarely used because they do not contain the chemicals being used. For safe handling and use of the chemicals, glass is most important as other materials fail to contain powerful solvents, acids and other agents. Drilling for unconventional gas uses many solvents and other strong chemical agents just like in a laboratory. A well drilled into the ground is then opened by the fracturing of rock at great temperature and pressure. Holes in the ground are permeable because the rock is permeable, the rock moves and naturally contains many faults and fissures, and due to the extraction process the rock is now more obliterated than fractured. The processes of fracking opens up deep and extensive fissures into the rock. The location and size of these fissures is inherently unpredictable. If predicting such fissures was possible then very few mining disasters would be likely. Mining disasters are common and they happen across many different types of mines and across all the countries of the world. For a local example we need only look less than 10 years ago to Beaconsfield, Tasmania in 2006. In this example many warnings had been given that the rock strata were unstable and that the mining going on was making things worse. Human beings have over 5,000 years experience in mining. Yet the great frequency of disasters shows that way too few lessons are being learned. This drilling is not the only source of methane.

Methane is not the only source of energy. We have many safer and better ways of getting what we want.

The chemicals used to extract unconventional gas are a great hazard. However, much worse is ignorance. In New South Wales and in Queensland investigation has proven conclusively that the authorities are not aware of what chemicals are being used. The extraction companies mention the need for confidentiality to protect the intellectual property of their operations. This need for confidentiality is outright insane. Government and authorities are not in competition with them. Even the public cannot possibly hope to find millions of dollars to acquire equipment and become rivals. If I want to pour something into your coffee you will insist on knowing what it is. If it is yellow and smells I am sure you won't trust me. Even if it looks nice you will still want to know what it is. Fracking and unconventional gas is not about a cup of coffee. It is about every glass of water. It is about every shower, every dam, every human and animal drinking, all the livestock, all the crops and all the trees for today, tomorrow and in decades, and probably thousands of years. Self regulation does not work anywhere. Who is checking that promises are kept - Who does the checking - are we leaving the fox in charge of the chickens ??

Just imagine for a moment if self-regulation should be tried for traffic control and safety. Perhaps homicide and rape? Laws are needed because people won't behave by themselves. Companies are much larger entities than people and they are motivated by profit. The only way they will obey laws or regulations is if they are enforced. People and companies must have a clear expectation that the law exists and

that it will be enforced. Authorities not knowing which chemicals are being used is a long way south of stupid.

Pouring chemicals into holes drilled into the earth from many different angles under great pressure in order to liberate gas that has bound itself to rock over thousands and thousands of years must involve great danger. The rocks are permeable and the chemicals and gas will seep through. When the rocks are actively fractured what you have is a total lack of containment. Without containment what you have is the guaranteed dumping of toxic waste which will permeate over vast areas and deeply through the rock strata due to the pressures involved and the fracturing of rock. Also the methane which is now mobile will leak because of this complete lack of containment. Some will go back up to the surface through the well-head, but much of it will leak both near and afar.

The drilling industry advertises itself as being environmental because burning methane is better than burning coal. This is true. Burning methane does create less carbon dioxide than burning coal. However, there are many more factors involved here :-

- 1/ The world is moving away from all fossil fuels as all of them are causing great damage to the atmosphere, and therefore our climate.
- 2/ In many cases renewable energy are cheaper than fossil fuels.
- 3/ Renewable energy is becoming cheaper still at a rapid rate while the cost of fossil fuels continues to rise.
- 4/ In the case of methane we have many sources which are currently under utilised :- oil rigs, oil refineries, manure, waste dumps, crop processing and waste food.

5/ Producing unconventional gas has a very strong record of methane leaking into the atmosphere. This methane was bound to the rock and clearly would have remained so without the drilling. As methane is over 20 times more potent to global warming than carbon dioxide, then any small degree of leaking at all means that producing methane in this way is doing much more harm than good.

Safety is remarkably important here. The track record of this industry is already quite terrible.

Along with the problems in the ground there is the great use of water. This water must be transported and then disposed of somewhere. The chemicals used must also be transported. Trucks don't crash often but the danger of a very nasty spill and contamination will always be present. What precautions do the workers in the drilling and transport take? If workers or the public do get sick who will pay for their health care and support their families after the short-lived drilling companies are gone.

It has taken many years for the admission that the CFA operations at Fiskville were any risk at all. Any chemist with decent knowledge would have predicted trouble from the very beginning. The danger of unconventional gas extraction is very obvious. We must not wait years to admit it. We need to see how so much has already gone very wrong in the United States, in England and a number of other countries. We need to see how so much has already gone very wrong just north of us in Queensland and New South Wales. We must stop this most terrible scourge from invading our state. The great danger is more obvious than ever before. The economic benefit is becoming less every day.

It is indeed likely that there will be no profit at all. The economic costs to agriculture, tourism, and healthcare for all us can easily be predicted, and are much greater than any potential profit. The need for more fossil fuel is disappearing quickly.

I am asking for a permanent ban on all unconventional gas drilling both commercial and prospective. I ask for this on behalf of myself, on behalf of my fellow Victorians, on behalf of all of our children, and most importantly on behalf of all generations into the future.

This decision matters greatly to all Victorians today, and in hundreds if not thousands of years into our future. Pollution of this type has no known means of clean-up. Such pollution will be present until the rock strata are eventually swallowed into the inner layers of the molten earth.

I am a member of a local 'Lock the Gate' group. Through our many activities I have met many general public non-members and personally seen that no-one out of hundreds supports unconventional gas fields in our state. Only some of the politicians I have met seem undecided.

I have only touched on a few issues, but let me assure you, this industry is not welcome on my land, is not welcome in my community, and is not welcome in Victoria.

Kind regards,

Robert Brown

